CLAIMS:

We claim:

1. A method of optimizing a focus of an optical inspection apparatus, comprising:

irradiating a substrate with a first light;

sensing a second light reflected from the substrate using at least two focus values to form image information corresponding to the at least two focus values;

for each of the at least two focus values, obtaining a gain value for the corresponding image information; and

detecting defects on the substrate with the focus set to one of the at least two focus values that corresponds to a minimum gain value.

2. The method of claim 1, wherein irradiating the substrate comprises irradiating a semiconductor wafer.

3. The method of claim 1, wherein irradiating the substrate with the first light comprises irradiating the substrate with a first wavelength that is shorter than a wavelength in the visible spectrum.

4. The method of claim 3, wherein irradiating the substrate with the first wavelength comprises irradiating the substrate with an ultraviolet wavelength.

5. The method of claim 1, wherein forming image information comprises converting an analog current signal generated in accordance with an intensity of the first light to a digital signal.

6. The method of claim 5, wherein converting the analog current signal to the digital signal comprises converting the analog current signal to a digital signal that represents a gray scale level.

7. The method of claim 6, wherein the gray scale level has 256 levels.

8. A method of detecting defects, comprising:

irradiating a substrate with a first light, the substrate including a plurality of unit devices;

sensing a second light reflected from the substrate with at least two focus values to form first image information corresponding to the at least two focus values;

obtaining a relation between the at least two focus values and at least two gain values derived from the first image information;

irradiating the substrate with a third light;

sensing a fourth light reflected from the substrate with an optimized focus to form second image information, the optimized focus substantially equal to one of the at least two focus values that corresponds to a lesser value of the at least two gain values; and

detecting defects on the substrate using the second image information.

9. The method of claim 8, wherein irradiating the substrate comprises irradiating a semiconductor wafer.

10. The method of claim 8, wherein irradiating the substrate with the first and third lights comprises irradiating the substrate with a first and a third wavelength, respectively, the first and third wavelengths shorter than a wavelength in the visible spectrum.

11. The method of claim 10, wherein irradiating the substrate with the first and third wavelengths comprises irradiating the substrate with an ultraviolet wavelength.

12. The method of claim 8, wherein forming second image information comprises converting an analog current signal generated in accordance with an intensity of the third light to a digital signal.

13. The method of claim 12, wherein converting the analog current signal to the digital signal comprises converting to a digital signal that represents a gray scale level.

14. The method of claim 13, wherein the gray scale has 256 levels.

15. The method of claim 8, wherein detecting defects comprises:

setting a threshold value;

subtracting the second image information of an objective pixel from the second information of a pixel adjacent to the objective pixel to form image information data; and

comparing the image information data with the threshold value.

16. An apparatus comprising:

a supporting plate that supports a substrate that includes a plurality of unit devices;

a light source configured to irradiate the substrate with a first light;

an image information generator structure to sense a second light reflected from the substrate and to generate image information having a gain value;

a data processor structured to analyze a relation between the gain value and a focus used to obtain the image information;

a focus adjustor structured to set an optimized focus to the focus corresponding to a minimum gain value; and

a detector structured to determine defects using the image information obtained from the optimized focus.

17. The apparatus of claim 16, the image information generator comprising:

an image detector structured to sense the second light and to generate an analog image signal; and

an analog-to-digital converter structured to convert the analog image signal into a digital signal.

18. The apparatus of claim 16, the detector comprising:

a threshold value setting part structured to establish a threshold value;

a primitive data generating part structured to generate primitive data by subtracting the image information of an objective pixel from the image information of a pixel adjacent to the objective pixel; and

a comparator structured to compare an absolute value of the primitive data with the threshold value.

19. The apparatus of claim 16, the first light comprising a first wavelength that is shorter than a wavelength from the visible spectrum.

20. The apparatus of claim 19, the first wavelength comprising an ultraviolet wavelength.

21. The apparatus of claim 16, the image information comprising a digital signal.

22. The apparatus of claim 21, wherein the digital signal comprising a gray scale level.

23. The apparatus of claim 22, the gray scale level divided into 256 levels.

24. The apparatus of claim 16, further comprising a monitor that displays a pixel corresponding to a defective area of the substrate and the primitive data for the pixel.